

**II. REMARKS**

As an initial matter, Applicants note that the Examiner has not yet acknowledged Applicants' foreign priority claim. Applicants respectfully request that the Examiner acknowledge Applicants' foreign priority claim.

The Examiner has withdrawn, in part, the restriction/election requirement under 35 U.S.C. §§ 121 and 372 so that claims 1-3, 8-12 and 15-17 have been examined, and only claims 4-7, 13 and 14 have been withdrawn because they pertain to non-elected subject matter (Office Action, dated December 17, 2008, at 2, lines 15-17; and at 3, lines 1-3).

Applicants also gratefully acknowledge the Examiner's determination that claims 8-12 and 15-17 contain allowable subject matter (Office Action, dated December 17, 2008, at 9, lines 15-18).

By the present amendment, claims 8 and 9 have been cancelled without prejudice, claims 1-3, 10-12 and 15-17 have been amended, and new claims 18 and 19 have been added. Specifically, independent claim 1 has been amended to recite "moving a valve body of the actuator operating type valve from a state of full closing toward a direction of valve opening to a first degree of valve opening by increasing or decreasing driving input to an actuator of the actuator operating type valve" and "further increasing or decreasing the driving input to move the valve body from the first degree of valve opening to a state of full valve opening" as supported on page 30, line 12, to page 13, line 21, and on page 34, lines 4-11, of Applicants' specification as originally filed.

Claim 2 depends upon claim 1, and has been amended to improve grammar and clarity. Claim 3, which depends upon claim 1, has been amended to recite "a pressure rise value of the fluid passage is made to be within 10% of a first steady state pressure value before opening the valve" as supported on page 34, lines 16-23, of Applicants' specification as originally filed.

Dependent claims 10-12 have been amended to depend upon new claim 18, and dependent claims 15-17 have been amended to depend upon new claim 19. The present amendment has no further limiting effect on the scope of claims 10-12 and 15-17.

New independent claim 18 incorporates subject matter from previous claims 1 and 8. In fact, claim 18 corresponds to previous claim 8 rewritten in independent form and, therefore, has the same scope as previous claim 8. New independent claim 19 incorporates subject matter from previous claims 1 and 9. In fact, claim 19 corresponds to previous claim 9 rewritten in independent form and, therefore, has the same scope as previous claim 9.

The present amendment adds no new matter to the above-captioned application.

#### A. The Invention

The present invention pertains broadly to a method for water hammerless opening of a fluid passage, such as may be used to open a fluid passage during manufacture of semiconductors, chemicals, pharmaceuticals, and the like. Thus, in accordance with an embodiment of the present invention, a method for water hammerless opening of a fluid passage is provided that includes steps recited by independent claim 1. In accordance with another embodiment of the present invention, a method for water hammerless opening of a fluid passage is provided that includes steps recited by independent claim 18. In accordance with still another embodiment of the present invention, a method for water hammerless opening of a fluid passage is provided that includes steps recited by independent claim 19. Various other embodiments, in accordance with the present invention, are recited by the dependent claims.

An advantage provided by the various embodiments of the present invention is that a method for water hammerless opening of a fluid passage, such as may be used to open a fluid passage during manufacture of semiconductors, chemicals, pharmaceuticals, and the like, is

provided wherein the method allows for the opening of a fluid passage both surely and abruptly without the generation of a water hammer.

**B. The Rejections**

Claims 2, 3, 8-12 and 15-17 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite.

Claims 1 and 2 stand rejected on the grounds of nonstatutory obviousness-type double patenting as allegedly unpatentable over claim 1 of U.S. Patent No. 7,080,658 (hereafter, the “Ohmi’658 Patent”) in view of Burns (U.S. Patent 5,970,430, hereafter, the “Burns Patent”). Claims 1-3, 8 and 10-12 stand rejected on the grounds of nonstatutory obviousness-type double patenting as allegedly unpatentable over claims 4-7 of U.S. Patent No. 7,278,437 (hereafter, the “Ohmi’437 Patent”) in view of the Burns Patent. Claims 1-3, 9 and 15-17 stand rejected on the grounds of nonstatutory obviousness-type double patenting as allegedly unpatentable over claims 2-5 of the Ohmi’437 Patent in view of the Burns Patent.

Claims 1 and 2 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated by the Burns Patent.

Claim 3 stands rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over the Burns Patent.

Applicants respectfully traverse the Examiner’s rejections and request reconsideration of the above-captioned application for the following reasons.

**C. Applicants’ Arguments**

In view of the present amendment, claims 1-3, 10-12 and 15-19 are in compliance with 35 U.S.C. § 112.

**i. The Claims Comply with 35 U.S.C. § 112, Second Paragraph**

For a claim to comply with 35 U.S.C. § 112, second paragraph, it must (1) set forth what the Applicant regards as the invention and (2) it must do so with sufficient particularity and distinctness so as to be sufficiently “definite.” Solomon v. Kimberly-Clark Corp., 55 U.S.P.Q.2d 1279, 1282 (Fed. Cir. 2000). During patent prosecution, definiteness of a claim may be analyzed by consideration of evidence beyond the patent specification, including the inventor’s statements to the Patent and Trademark Office. Id. In view of the present amendment, claims 1-3, 10-12 and 15-19 are in compliance with 35 U.S.C. § 112, second paragraph, for the following reasons.

The Examiner objects to the phrase “an inner capacity of the valve” because it is unclear whether this phrase refers to the diaphragm chamber of the valve (Office Action, December 17, 2008, at 3, lines 12-13). The phrase “an inner capacity of the diaphragm valve” pertains to the type of valve, namely, to a “fixed capacity type diaphragm valve” that has an inner capacity that is fixed and that does not change with operation of the valve. Japanese Patent Document JP 11-118049 (hereafter, the “JP’049 Document”) discloses such a “fixed capacity type diaphragm valve,” and a copy of the JP-049 Document is filed herewith. A person of ordinary skill in the art would immediately realize that the language of claim 2 identifies a particular class or type of diaphragm valve, such as the valve shown in Figures 7 and 8 of the JP’049 Document.

Specifically, Figure 7 of the JP’049 Document shows a valve in a state of full valve closing (i.e., fully closed), and Figure 8 of the JP’049 Document shows the same valve but in a state of full valve opening (i.e., fully open). The “capacity,” namely the displacement of the diaphragm presser foot (35) of the JP’049 Document, is fixed and does not change during operation of the valve, as is well-known in the art. Therefore, a person of ordinary skill in the art would definitely understand what type or class of diaphragm valve is recited by claim 2.

With respect to claims 18 and 19, which correspond to previous claims 8 and 9 rewritten in independent form, the Examiner contends that the step operating pressure ( $P_s'$ ) is not clearly described (Office Action, dated December 17, 2008, at 4, lines 1-17). Applicants disagree.

Paragraphs [0068], [0069], [0072], [0074], [0077], [0085], and etc., of Applicants' original specification describe that, for example with respect to the tuning box (19), "optimal values" for the step operating pressure  $P_s'$  of the actuator operating pressure  $P_a$ , and of the step operating pressure holding time  $t$ , are computed (See, e.g., Figure 15 of Applicants' original disclosure for an illustration relating  $P_s'$  and  $t$ ). Thus, the control signal  $S_c$  may be outputted to the electro-pneumatic conversion device (20), which makes the actuator operating pressure  $P_a$  output from the electro-pneumatic conversion device (20) to the actuator (11), (See, e.g., ¶ [0059] of Applicants' specification as originally filed).

According to Applicants' specification, the control signal  $S_c$  is a signal that encompasses the corrected step pressure setting signal  $P_s$  corrected by computation and the holding time setting signal  $T_s$ . The control signal  $S_c$  is inputted to the electro-pneumatic conversion control device (17), or the electro-pneumatic conversion device (20), to control the actuator operating pressure  $P_a$ . Therefore, " $P_s$ " is not used to control the control signal  $S_c$ .

Thus, a person of ordinary skill in the art would realize that the step operating pressure  $P_s'$  is not used to determine  $S_c$ . On the contrary, the control signal  $S_c$  is used to open the diaphragm valve, according to the present invention, so that the control signal  $S_c$  effects the step operating pressure  $P_s'$  during valve opening in a manner so as to avoid generation of vibration (i.e., the water hammer), (See Applicants' Original Specification, at 30, line 17, to 31, line 31, Figure 14).

For all of the above reasons, claims 1-3, 10-12 and 15-19 particularly point out and distinctly claim the invention in compliance with 35 U.S.C. § 112, second paragraph,

**ii. The Obviousness-type Double Patenting Rejections**

The Federal Circuit has ruled that in order to justify a double patenting rejection an analysis of the claims at issue are required, and not an analysis limited to the disclosure of the patents whose claims are relied upon to demonstrate double patenting. General Foods Corp. v. Studiengesellschaft Kohle mbH, 23 U.S.P.Q.2d 1839, 1846 (Fed. Cir. 1992). The disclosure of the patent cited in support of the double patenting rejection cannot be used as though it were prior art. Id. In particular, the Federal Circuit has held that an obviousness-type double patenting rejection involves two inquiries: first, is the same invention claimed twice, and second, if not, does the pending claim define merely an obvious variation of the patented claim. In re Goodman, 29 U.S.P.Q.2d 2010, 2016 (Fed. Cir. 1993).

In the present case, the Examiner has not established a prima facie case of obviousness-type double patenting based on the claims of the Ohmi'658 Patent because the claimed invention, **a water hammerless closing device**, pertains to a completely different statutory class (i.e., an apparatus) than the presently claimed invention to a "**method for water hammerless opening of a fluid passage**," which pertains to a method. In other words, the Examiner has not established a prima facie case of obviousness-type double patenting based on the claims of the Ohmi'658 Patent because not only has the Examiner not compared the claimed inventions, comparison of the claimed inventions shows that not a single claimed limitation is shared by the substantially different and non-obvious claims of the present method invention with the apparatus claims of the Ohmi'658 Patent.

For all of the above reasons, the Examiner's obviousness-type double patenting rejection based on claims of the Ohmi'658 Patent is untenable and should be withdrawn.

With respect to the Ohmi'437 Patent, the Examiner has likewise failed to compare the claimed inventions. However, Applicants file herewith, with respect to the Ohmi'437 Patent, a terminal disclaimer in compliance with 37 C.F.R. § 1.321. Therefore, the obviousness-type double patenting rejection based on the Ohmi'437 Patent has been overcome by the timely filed terminal disclaimer and is now moot.

### **iii. The Section 102 Rejection**

Anticipation under 35 U.S.C. § 102 requires showing the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). The Examiner has failed to establish a prima facie case of anticipation against independent claim 1 because the Burns Patent does not teach, or suggest, each and every limitation recited by this claim.

### **iv. The Burns Patent**

The Burns Patent discloses a “local device and process diagnostics in a process control network having distributed control functions” (See Abstract). In one embodiment disclosed by the Burns Patent, a public diagnostic causes a valve (109), such as shown in Figure 6, to move in a step-wise ramping manner according to Figure 10A (Burns Patent, col. 17, line 66, to col. 20, line 25). However, the Burns Patent discloses only a diagnostic “test operative cycle” for the valve (109). The Burns Patent does not teach, or even suggest, (i) “the fluid passage is opened without causing a water hammer” as recited by claim 1.

However, this is not the only deficiency in the disclosure of the Burns Patent. The Burns Patent also does not teach, or suggest, (ii) “providing a fluid passage...wherein the

fluid passage has a nearly constant pressure inside the pipe passage” as recited by independent claim 1.

Furthermore, the Burns Patent does not teach, or suggest, (iii) “moving a valve body of the actuator operating type valve from a state of full closing toward a direction of valve opening to a first degree of valve opening” and “further increasing or decreasing the driving input to move the valve body from the first degree of valve opening to a state of full valve opening so the fluid passage is opened without causing a water hammer” as recited by claim 1.

In other words, the Burns Patent does not teach, or suggest, a 2-step method for opening a valve so as not to generate the water hammer effect.

More specifically, the Burns Patent discloses a diagnostic method for operating conditions and control of opening and closing of networked valves (See, e.g., the digital field device of Figure 6 of the Burns Patent). The Burns Patent is completely silent regarding the water hammer effect and how to take steps to avoid it when opening or closing a valve. The technological idea of preventing generation of considerable vibration that occurs in fluid pressure inside a pipe when the pipe has a valve installed thereon, and the valve is operated to open from a fully closed state to a fully open state, is neither disclosed nor suggested by the Burns Patent.

The Burns Patent also does not teach, or suggest, a two-step valve opening method to avoid the water hammer effect, wherein in the first step the partially-opened position is held for a short time,  $\Delta t$ , before the valve is moved to the fully opened position in a second step. According to the Burns Patent, a valve (109) may be opened in a plurality of steps, in particular five steps, made at constant intervals as shown in Figure 10A of Burns. The idea of preventing a water hammer effect from occurring during opening of a valve is not disclosed in the Burns Patent. The Burns Patent also does not teach, or suggest, opening a

valve from fully closed state to fully opened state in two steps without creating a water hammer effect.

For all of the above reasons, the Examiner has failed to establish a prima facie case of anticipation against independent claim 1 using the disclosure of the Burns Patent.

**v. The Burns Patent Cannot Render Obvious Applicants' Claimed Invention**

For all of the above reasons, the Burns Patent cannot render obvious the subject matter of claim 1 because the Burns Patent fails to teach each and every limitation of the claimed invention, arranged as in the claims.

It is a well-settled proposition that a prima facie case of obviousness requires a showing that the scope and content of the prior art teaches each and every element of the claimed invention, and that the prior art provides some teaching, suggestion or motivation, or other legitimate reason, for combining the references in the manner claimed. KSR International Co. v. Teleflex Inc., 127 S.Ct. 1727, 1739-41 (2007); In re Oetiker, 24 U.S.P.Q.2d 1443 (Fed. Cir. 1992). As discussed above, the Burns Patent does not teach, or suggest, (i) “providing a fluid passage...wherein the fluid passage has a nearly constant pressure inside the pipe passage,” (ii) “moving a valve body of the actuator operating type valve from a state of full closing toward a direction of valve opening to a first degree of valve opening” and “further increasing or decreasing the driving input to move the valve body from the first degree of valve opening to a state of full valve opening,” and (iii) “the fluid passage is opened without causing a water hammer” as recited by claim 1.

The Burns Patent additionally discloses in Figure 10C, and at col. 28, lines 9-12, a one-step valve opening method for opening the valve (109) from a full-closed status to a full-open status. The Burns Patent does not teach, or suggest, operating a valve so that it moves

from a full-closed status to a full-open status in two steps. The Burns Patent also does not teach, or suggest, maintaining the vibration of fluid pressure in a pipe passage to within 10% of the initial pressure (i.e., the pressure before the opening operation is initiated). Therefore, the Burns Patent also does not teach, or suggest, (iv) “a pressure rise value of the fluid passage is made to be within 10% of a first steady state pressure value before opening the valve” as recited by claim 3.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against claims 1 and 3 of the above-captioned application.

**vi. The Burns Patent Cannot Provide a Reasonable Expectation of Success of Avoiding the Water Hammer with a Two-Step Procedure**

A proper rejection under Section 103 requires showing (1) that a person of ordinary skill in the art would have had a legitimate reason to attempt to make the composition or device, or to carry out the claimed process, and (2) that the person of ordinary skill in the art would have had a reasonable expectation of success in doing so. PharmaStem Therapeutics, Inc. v. ViaCell, Inc., 491 F.3d 1342, 1360 (Fed. Cir. 2007). In this case, the Examiner has failed to show that a person of ordinary skill in the art would have had a legitimate reason to modify the methods disclosed by the Burns Patent so as to perform a two-step opening operation as claimed, and the Examiner has failed to show that even if such a modification of the Burns Patent was made, that the result would be a method wherein “the fluid passage is opened without causing a water hammer” as recited by claim 1.

As described in Applicants’ specification, at 22, lines 3-9, a two-step opening operation does not necessarily result in avoidance of the water hammer effect because the two-step opening operation generally needs to be carefully adjusted in order to avoid generating a water hammer. Therefore, because the Burns Patent fails to teach, or suggest, how to open a valve

without generating a water hammer, a person of ordinary skill in the art would have no reasonable expectation of success of arriving at Applicants' claimed invention, which does not generate a water hammer when the valve is opened in two-steps, even if the methods disclosed by Burns Patent were modified to open the valve (109) in two-steps.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against claims 1 and 3 of the above-captioned application.

### **III. CONCLUSION**

Claims 1-3, 10-12 and 15-19 are in compliance with 35 U.S.C. § 112. Therefore, independent claims 18 and 19 are allowable for the reasons of record. Furthermore, Applicants have filed herewith a terminal disclaimer with respect to the Ohmi'437 Patent, thereby obviating the Examiner's obviousness-type double patenting rejection regarding this patent. With respect to the Examiner's obviousness-type double patenting rejection based on the Ohmi'658 Patent, the Examiner has failed to establish a prima facie case of obviousness-type double patenting because the presently claimed invention pertains to a method and the invention claimed by the Ohmi'658 Patent pertains to an apparatus. Therefore, the claims of the present application pertains to a substantially different statutory class than the claimed invention of the Ohmi'658 Patent, and the Examiner has failed to demonstrate that there is any subject matter whatsoever overlapping these two claimed inventions.

The Examiner has also failed to establish either a prima facie case of anticipation under 35 U.S.C. § 102(b), or of obviousness under 35 U.S.C. § 103(a), against Applicants' claims 1 and 5 because the Burns Patent fails to teach, or even suggest, (i) "providing a fluid passage...wherein the fluid passage has a nearly constant pressure inside the pipe passage," (ii) "moving a valve body of the actuator operating type valve from a state of full closing toward a direction of valve opening to a first degree of valve opening" and "further

increasing or decreasing the driving input to move the valve body from the first degree of valve opening to a state of full valve opening,” (iii) “the fluid passage is opened without causing a water hammer” as recited by claim 1.

For all of the above reasons, claims 1-3, 10-12 and 15-19 are in condition for allowance, and a prompt notice of allowance is earnestly solicited.

The below-signed attorney for Applicants welcomes any questions.

Respectfully submitted,

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